I. Introduction

On July 12, 1983 Western States Minerals Corporation (pursuant to 43 CFR 3802) submitted a Plan of Operations to conduct mineral extraction activities in the Drum Mountains. This area lies in West Central Utah, approximately 30 miles northwest of the town of Delta.

II. Description of the Proposed Action and Alternatives

A. Proposed Action

The proposed activities would be conducted in Section 7, T. 15 S., R. 10 W. All operations would be carried out by Western States Minerals, 4975 Van Gordon Street, Wheat Ridge, Colorado 80033.

Western States Minerals proposes to conduct a gold mining operation consisting of open pit mines and leaching ponds. The operation will require about 85 acres of land. The operation which will disturb the surface are: open pit areas, waste dumps, roads, leach ponds, solution ponds, diversion ditch, maintenance shop, strip plant, and office.

The action would be on an area partially disturbed by previous mining operations.

B. Alternatives

1. Deny the application (no action). This alternative would create no environmental impacts, however, it would be inconsistent with House Range MFP, 43 CFR 3802.0-2, and Section 102(a)(12) of the Federal Land Policy and Management Act (FLMPA).

In addition, the mining of gold in the area would be lost.

III. Description of the Existing Environment

A. Non-Living

1. Atmospheric Resources

The climate in the subject area is semi-arid, with temperature extremes ranging from approximately -32°F to 106°F, and annual precipitation averaging around eight inches. Air quality is generally excellent, and noise levels are low.

2. Topography

The Drum Mountains lies on the very eastern edge of the Basin and Range Physiographic Province. The mine is in limestone on the edge of a quartz latite intrusion. Elevations in the area range from 5925 to 6075 feet above sea level.

3. Soils

Very little top soil is found in the subject area. That which is found is rocky and of poor quality in the pit area while that in the

depressions is better developed with depths up to two feet.

4. Geology

Regional geology is characterized by typical Basin and Range structural features. Alluvium filled fault-block valleys (grabens), are seperated by north-south trending fault-block mountains (horsts). The Drum Mountains are one such range. The mine is located in limestone on the edge of a quartz latite intrusion.

5. Water - Watersheds

The subject area is characterized by internal drainage, which is confined to surrounding basins. Drainage is in all directions, and is intermittent.

B. Living Components

1. Vegetation

Vegetation in the subject area is characteristic of medium to high elevation desert. Typical varieties include rabbitbrush, black sagebrush, shadscale, Mormon tea, viscid rabbitbrush, juniper, and various grasses. No threatened or endangered species are known to occur here. (see attached report)

2. Fish and Wildlife

The subject lands do not contain any known game species, threatened or endangered species, or aquatic habitat. Typical wildlife varieties include antelope, jackrabbits, coyotes, mice and various birds and reptiles.

C. Human Resources

1. Antiquities - Historic Values

No known resources are located in the subject area. (see attached report.

2. Natural Areas

The project lies in the Drum Mountains which has been classified as non-WSA.

IV. Analysis of the Proposed Action and Alternatives

A. Environmental Impacts

1. Non-Living

a. Atmospheric Resources

The proposed action would likely have only a slight to very light impact on air quality, in the form of dust from motor vehicle travel and

mining operations. In addition, short-term relatively high level noise would result from the use of mining equipment, etc.

b. Topography

Impact on topography from the proposed action would be the pit from the removal of the ore, overburden discard area and the leaching areas.

c. Soils

Impact on soils from the proposed action would be the removal of topsoil associated with open pit mining and the coverage by overburden, and leaching ponds.

d. Geology

The proposed action would not affect minerals other than those targeted.

e. Water-Watersheds

The proposed action would not increase erosion or flooding nor decrease surface or underground water quality.

2. Living Components

a. Vegetation

Impacts to vegetation would be limited to those areas of undisturbed vegetation within the mining operations area. A major portion of the area has been denuded of vegetation through prior mining operations. Affected vegetation would consist of brush and grasses, as there are no trees within the area designated for disturbance.

b. Fish and Wildlife

Impacts to wildlife would consist essentially of disruptions associated with the mining, hauling, leaching, other mining operations, and associated noise, etc. Because of the relatively small area that would be affected, the nature of the wildlife in the area, and the duration of the proposed activity, none of the potential impacts to wildlife is considered significant.

3. Human Resources

a. Antiquities - Historic Values

The proposed action would have no impact on cultural resources (see attached report).

b. Natural Areas

The proposed action is outside any wilderness or national study areas.

B. Anticipated Impacts of the Alternative Actions

1. Deny the Application (No Action)

The alternative would result in no environmental impacts; however, it would be inconsistent with the House Range MFP, 43 CFR 3802.0-2, and Section 102(a)(12) of FLPMA. In addition, the mining of gold from the area would be denied.

C. Possible Mitigating or Enhancing Measures

The following should be considered for inclusion in any mitigating measures:

1. The operator shall advise working crews to avoid unnecessary disturbance of livestock and wildlife during the mining operations.

2. Proper precautions shall be taken at all times to prevent and suppress fires.

3. Personnel will refrain from collecting artifacts and otherwise disturbing cultural resources.

4. Should any archaeological or paleontological resource values be discovered during operations, they shall be left intact, and the Authorized Officer notified immediately.

5. The operator shall protect and preserve all survey monuments, reference monuments, witness corners, and bearing trees.

6. All garbage, flagging, and debris shall be disposed of by placing in a garbage pit or collected from the area and hauled to a proper disposal site.

7. Sanitary facilities will be by portable chemical toilets. The waste will be disposed of at a proper disposal site. No oil, grease, or hazardous substance shall be drained onto the ground surface or discharged into any water way.

8. Leaching ponds shall be lined to prevent any contamination of underground water sources.

9. If the authorized officer determines that unacceptable quantities of dust are being emitted into the air, the operator shall take proper steps (e.g., sprinkling) to alleviate the situation.

10. Topsoil will be removed and stockpiled from the leaching area, shop area and valley bottoms in the waste dump area. Topsoil will be spread over those areas at the operations closure which can feasibly be revegetated.

11. Reclamation of the mining operation area will include the fencing of the mine high wall for safety. The reshaping and regrading of the heap leaching area, collection ditches, recovery plant, ponds, and diversion ditches will be done to approximate original contour.

12. Disturbed areas will be seed drilled with hay mulching where necessary. Seeding will take place in Fall (Sept. 15). Seed will consist of:

Western wheat	5#/acre
Indian ricegrass	1#/acre
Yellow sweet clover	3#/acre
Shadscale	1#/acre
	10#/acre

The authorized officer will be notified prior to the commencement of reseeding operations.

13. That the leaching pond site be fenced with a suitable fence to keep livestock from endangering themselves by drinking the solutions or miring in the wet material.

14. Bond be in conformance as set by Utah State Division of Natural Resources, Division of Oil, Gas and Minerals.

D. Residual Impacts

This would be limited to possible destruction of some vegetation, mine high walls, and steep spoil pile slopes for the proposed action. A "No Action" alternative would result in no residual impacts.

E. Relationship Between Short-Term Use and Long-Term Productivity

The proposed action or alternative would not preclude any long-term use of the subject area.

F. Irreversible or Irretrievable Commitments of Resources

The proposed action would have irreversible and irretrievable commitments on the resources, as gold would be extracted from the mine site and vegetation from those areas not reseeded would be lost.

"No Action" alternative would represent no irreversible or irretrievable commitments of resources.

V. Recordation of Persons, Groups and Governmental Agencies Consulted

Dave Darby - Utah State Oil, Gas and Minerals Division
Bob Roggenthen - Western States Minerals Corporation

VI. Intensity of Public Interest

A moderate level of public interest is expected for this project due to the fact that the project will be removed of gold close to Delta.

VII. Participating Staff

Brent Crosland - Range Technician
Harvey Gates - Range Conservationist
Birrell Hirschi - Surface Protection Specialist
Chuck Horsburgh - District Geologist
Stewart Jacobson - Recreation Specialist
Mark Pierce - Wildlife Biologist
Marion Rivette - Archaeologist
Tom Terry - Realty Specialist

the final material on the slopes. This larger material will hold and stabilize the outer slopes and minimize erosion potential.

5.3 Heap Leaching

5.3.1 General Description and Design Considerations

General Description - The leach site is positioned northwest of the ore body within the claim boundaries. The leach pads will have a general configuration of tilted plane(see Figure 5-3). The pad slope parallel to the collection ditches will be 2 percent, while the slope perpendicular to the collection ditches will be at 4 percent.

The heaps will be encircled by a berm to keep leach solutions within the pad perimeter and also keep the solutions from being diluted by natural runoff. Between this perimeter berm and the outside edge of the heap are two collection ditches that divert solutions to collection ponds.

For the safety and security, the leach site will be completely fenced to minimize access. The fence will be made up of a 36 inch mesh with two barbed wires 12 inches and 24 inches above the top of the mesh fence respectively.

Design Considerations - This section describes the general design and layout of the leach pads and associated facilities. These facilities do not include the metal recovery plant. The leach facilities design was based on the following criteria.

a) The pad size will be approximately 455 ft x 650 ft. The heaps will be constructed to a relatively uniform depth. Using the anticipated density of 16.5 ft^3/ton, the 471,279 tons of ore will be placed in three heaps approximately 12 ft deep.

BOND ESTIMATE

STATE OF UTAH
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING
4241 State Office Building
Salt Lake City, Utah 84114

ERATION	ACRES	COST/ACRE	CUBIC YARDS	COST/CY	TOTAL
A. Removal of structures and equipment					
1. Electrical equipment - mobile generator - 2 poles					700
2. Major mobile equipment - generator		- $500			
3. Major stationary equipment - 2 poles		- $200			
4. Service mill and office facilities - One temporary office building and shop 60 hrs. @ $50.00/hr. = 3000 Strip plant and lab - 40 hrs @ $50.00/hr. = 2000					5,000
B. Removal of trash and extraneous debris - Final cleanup - $250 (trash buried daily in dump) contaminants (oil, etc.) hauled out periodically as needed.					250
C. Regrading and recountouring of waste rock and waste disposal sites, tailings and sediment ponds. Diversions and areas of critical grade.					
1. Earthwork to final grade - heap leach pads - 7 days = $6,250 (D-9 Cat) mine and waste dump - 3 days = $2,680 $9,930 (final)					9,930

OPERATION	ACRES	COST/ACRE	CUBIC YARDS	COST/CY	TOTAL
2. Topsoil replacement					
a. Procurement (if necessary)					$23,393
b. Respreading	29 ac.ft.		46,786	$.50	23,393
3. Stabilization					$18,000
a. Reseeding	45 acres	$355			15,975
b. Fertilization					
c. Mulching	45 acres	$50			2,250
d. Irrigation					
D. Safety					
1. Erection of portal coverings and fences	Fencing modification and installation 3500 feet @ $2.40/foot				8,400
2. Plugging of boreholes and exploratory openings	---				
3. Removal of hazardous materials	---				
4. Elimination of highwalls.	---				

OPERATION	ACRES	COST/ACRE	CUBIC YARDS	COST/CY	TOTAL
E. Foundation elimination and transportation corridor reclamation	---				
1. Burial and/or break-up	---				
2. Removal	---				
F. Monitoring					
1. Continuing or periodic monitoring sampling and testing deemed necessary	3 times @ $780				2,340
G. Site specific varations from aesthetic costs				Subtotal	68,238
H. Contingency and contractual costs					+10%
Inflation factor					
TOTAL					$ 75,060

ATTACHMENT 1

5.3 Heap Leaching

5.3.1 General Description and Design Considerations

General Description - The leach site is positioned northwest of the ore body within the claim boundaries. The leach pads will have a general configuration of tilted plan (see Figure 5-3). The pad slope parallel to the collection ditches will be 2 percent, while the slope perpendicular to the collection ditches will be at 4 percent.

The heaps will be encircled by a berm to keep leach solutions within the pad perimeter and also keep the solutions from being diluted by natural runoff. Between this perimeter berm and the outside edge of the heap are two collection ditches that divert solutions to collection ponds.

For safety and security, the leach site will be completely fenced to minimize access.

Design Considerations - This section describes the general design and layout of the leach pads and associated facilities. These facilities do not include the metal recovery plant. The leach facilities design was based on the following criteria.

a) The pad size will be approximately 455 ft x 650 ft. The heaps will be constructed to a relatively uniform depth. Using the anticipated density of 16.5 ft^3/ton, the 471,279 tons of ore will be placed in three heaps approximately 12 ft deep.

b) The geotechnical characteristics anticipated for the ore in the heap are assumed to be the same as the geotechnical characteristics obtained from column leaching and physical testing of the ore samples.

c) The leach facilities will be located within Drum Mine joint-venture claim boundaries northwest of the planned open pit.

d) Ore will be delivered to the pad by 35 ton, off-highway haul trucks. The ore will then be stacked to a depth of 12 ft by front-end loaders, thus minimizing compaction of the ore.

e) The flow of solution through the adsorption plant will be approximately 500 gpm. Solutions will be applied to several sections of the heap at the same time. The amount of pad area under leach at any one time will not exceed 25 percent of the total area of the pad. The application rate will average 0.00347 gpm/sq ft, but will not exceed 0.0045 gpm/sq ft.

f) Operation of the system will be on a regular basis. The anticipated schedule is 24 hours per day, 7 days per week for the solution application systems. Application areas will be changed after economics dictate that a heap has been thoroughly processed.

g) Hydrologic design will be based on 25-year rainfall statistics (see Appendix B).

5.3.2 Liner

The possible liner alternatives for heap leaching include synthetic, clay, and asphalt. Based upon the size of the pads, anticipated project life, cost, and construction factors, a synthetic liner was chosen as the best alternative.

The synthetic liner recommended for the leach pad consists of a combination of synthetic liner materials. In areas where resistance to sunlight, abrasion, and tensile stresses is required, hypalon is to be used. In most areas beneath the heap, a standard thickness PVC is to be used.

Integrity of the synthetic liner will be protected during construction and operation. Major steps toward insuring this protection include proper scarifying, compacting, and smoothing of the subsoil beneath the liner and the spreading of a protective layer of sand over the liner immediately after installation. This protective blanket will be applied to the liner after its installation to prevent ripping by the wind.

5.3.3 Leachate Collection System

The solution within the heap will be collected by gravity flow. Each pad has been designed with a slope of 4 percent and 2 percent, respectively. This collection system is shown schematically in Figure 4-1.

Solution from the heap daylights at the perimeter of the heap and is collected in open ditches. The ditches slope to the corner of the pad where the solution flows by gravity into the pregnant solution pond. The collection ditches sloping at 4 percent may have high velocity flows during times of storm.

The solution in the pregnant pond may be pumped to the plant or the barren pond, depending on the tenor of the solution. This flow takes place within the perimeter of the collection system in the event of pipe breakage. The stripped solution from the adsorption columns will flow by gravity into the barren pond. The barren pond

will be the place for addition of chemicals or makeup water prior to pumping to the heap for reapplication. The capacities of the pregnant and barren ponds are 2,100,000 gallons each. The pond designs are shown in Figure 5-4.

5.3.4 Runoff Collection and Diversion

The site is protected from storm runoff by diversion ditches and collection facilities within the pad perimeter. The layout of these facilities is shown in Map 3-1. The diversion facility design is summarized in Appendix B, Hydrology Report.

The runoff from the drainage area upstream from the site is collected by diversion ditches and flows around the site. Where sections of the diversion ditches approach a steep grade, riprap or other materials should be used for erosion control.

Runoff within the leach pad area is collected by the open ditches within the pad perimeter. These collection ditches are sized for runoff plus leach solution flowing to the pregnant solution pond.

Runoff from the pond and plant area will flow into the barren pond. The area is graded to drain to the pregnant solution pond to contain any chemical spills or other problems that may occur in the plant area.

In order to prevent unnecessary dilution of the pregnant solution, a small berm will be constructed around the perimeter of the pregnant pond to prevent runoff in the area from entering the pond. To prevent spillage of pregnant solution in case of excess volume, an overflow spillway is provided into the barren pond.

In case of catastrophic floods, an overflow spillway will be constructed from the pregnant pond into the diversion ditch at an elevation higher than the spillway into the barren pond. This emergency spillway will help to protect the embankment which forms the pond perimeter from erosion and subsequent failure. In the event of excess flood water, surge ponds can be used for water storage purposes.

5.3.5 Construction

The major steps in constructing the leach ponds and related facilities are outlined below.

Site Preparation - Vegetation is removed from the site. The upper 6 to 12 inchs of soil is removed from the site and stockpiled for future reclamation use.

Grading - The leach pond site is shaped according to specifications. At the same time the pond is shaped and excavated, some of the soil from pond excavation will be used as fill for the leach pond.

Preparation for Liner - The leach pad and pond sites are smoothed and rolled to provide an adequate base for the synthetic liner. The site soil will provide an adequate base after all sharp rocks and objects are removed.

Structures - Prior to liner installation, ditches, berms, and ponds within the pad area are constructed. The structure should be prepared to the same specifications as the pad base. During this construction process, edges on structures should be rounded to minimize stress on the liner.

Liner Installation - Factory-prepared synthetic liner is unfolded, spread, and field bonded. A protective blanket of sand is placed on top of the liner as soon as possible. This protective sand blanket should be such that 100 percent passes 7/8-inch mesh.

Concurrent with Pad Construction - The adsorption unit plant and associated structures will be constructed to process in a timely fashion.

Heap Construction - The heap is constructed as ore comes from the pit. The ore is hauled by off-highway haul trucks and dumped at a convenient stockpile area. A front-end loader is then used to pick up the ore and stack the ore at a height of 12 ft. The advancing face of the heap section moves from the lower to the upper end of the pad.

5.3.6 Processing Operation

The general sequence for operation of the system is outlined below.

Operating Sequence - The system will operate on a 7-day per week basis, except for maintenance shutdown. The solution will be applied 24-hours per day. The adsorption unit will operate 24-hours per day.

Operation During Heap Construction - Leaching can take place as soon as the first two sections are completed. The berms within the pad will control the solution flows. A section will have solution applied to it until the solution strength becomes uneconomic to process directly. When the solution from a section is no longer economical to process directly, the solution will

be diverted into the barren pond for solution concentration.

Completed Heap Operation - When all the heap sections are completed, leaching will proceed on a regular sequence. The solution will be applied for approximately 90 days, with recurrent solution application every 3 months thereafter for a period up to 26 months.